

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Davis, et al.	§	Case: 6716/ETCH/SILICON
	§	
Serial No.: 10/674,568	§	Filed: September 29, 2003
	§	
Examiner: Ram N. Kackar	§	Group Art Unit No. 1763
	§	
Confirmation No.: 3852	§	
	§	
Title: METHOD AND SYSTEM FOR	§	
MONITORING AN ETCH PROCESS	§	

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

REPLY BRIEF

Appellants submit this Reply Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 1763 dated June 25, 2008, finally rejecting claims 1, 3-4, 6-13, 15-18, 20-21, 23-30, 32-33 and 50-59. While Appellants maintain each of the arguments submitted in Appellants' previously submitted Appeal Brief, Appellants make the following further arguments in light of the Examiner's Answer.

This Reply Brief is believed to be timely since electronically transmitted by the due date of June 3, 2009, as set by mailing date of the Examiner's Answer mailed April 3, 2009. Please charge any additional fees that may be required to make this Reply Brief timely and acceptable to Deposit Account No. 20-0782.

ARGUMENTS

Appellants supplement their arguments in response to the remarks presented in the Examiner's Answer dated April 3, 2009.

The Examiner asserts that *Toprac's* disclosure is about improvement to etching process of semiconductor structure having critical dimensions using appropriate tools and processes. In response, the Appellants respectfully submit that *Toprac* teaches measuring a thickness of a process layer disposed on a substrate before an etching process. A removal rate may be determined based on the measured thickness of the process layer. However, *Toprac* does not teach or suggest analyzing a pre-etch measurement information to determine that a patterning is of a sufficient quality to allow for etching of the substrate. The Appellants respectfully submit that *Toprac* merely teaches measuring the thickness of a process layer and determine an end point of the process. *Toprac* does not analyze the measured data. Furthermore, *Toprac* does not teach or suggest how to determine which tool is appropriate to be used in light of the analysis of the measured data.

The Examiner further asserts that *Payne* is directed to removing outliers (erroneous data) similar to *Tanaka*. As discussed in the Appeal Brief filed dated December 9, 2008, *Payne* teaches improving contrast, resolution or image quality of a photograph. The analysis of *Payne's* photograph is directed to software configurations and mathematical algorithms. The Appellants respectfully submit that the analysis process of *Payne* and the claimed pre-etch measuring process of the present application are not only not belonging to different fields, but also utilize totally different technologies and methodologies of the analysis and measurement. They also are not intended to solve the same problem, as asserted by the Examiner. The object being detected, the technology involved, the analyzing manner utilized, and the solutions being implemented are all different with no commonality.

"[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006), cited with approval in *KSR Int'l Co. v. Teleflex, Inc.*, 126 S. Ct.

2965 (2006). Here, as the teaching of *Payne* involves totally different technologies, approaches to solve, and rational utilized, the Examiner does not provide sufficient evidence and explanation as regard to why one of ordinary skill in the art, when confronted the teaching of *Payne*, would look into its image reshaping technology of a photograph and incorporate it to a measurement process of a semiconductor structure as taught by other cited references.

The Examiner further asserts that although *Toprac* does not directly suggest determining pre-etch quality, it must do so in order to determine a process recipe needed to meet a target. However, the Examiner has not provided evidence of what type of “pre-etch quality” would be sought by *Toprac* or how it may be used. The Appellants specifically claim that the pre-etch measurement is of critical dimension (CD) measurements, and that information regarding the critical dimension (CD) measurements is used for three claimed functions; a) to determine that a patterning is of a sufficient quality to allow for etching of the substrate, b) to determine process parameters to an etch process; and c) to terminate the etch process based on the pre-etch measurement information in combination with etch process monitoring. The Examiner has not provided evidence how one skilled in the art would know that the “pre-etch quality” of *Toprac* or other reference would render the specific claim elements and their claimed relation obvious.

Furthermore, the Federal Circuit has also ruled that “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” The Appellants submit that the Examiner is using impermissible hindsight in light of the disclosure in Applicants’ patent application to pick and choose isolated element in each cited references to deprecate the claimed invention.

Additionally, the Examiner asserts that *Tanaka* is used for its teaching of filtering outliers and the Appellant’s argument against references individually is not proper since the rejection relies on combination. The Appellants respectfully disagree.

The Examiner cites *Tanaka* for its teaching of filtering outliers. However, the Examiner does not provide the evidence that combining the filtering outliers of *Tanaka* into the apparatus of the combined references would necessarily yield the claimed

invention, because the cited references, as individually discussed, do not each or suggest features that could either be aggregated to yield the claimed invention or be utilized to modify other features of references to yield the claimed invention. Here, *Tanaka* fails to bridge the gap between the references and the claimed invention. Additionally, the Appellants submit that each technology selected to perform the designed process requires particular arrangement and consideration for the compatibility of the associated process conditions so as to ensure the integration of the designated operation of the apparatus and process. The Appellants submit that the Examiner is analyzing each element of Applicant's claim separately, and picking elements taught in disparate references, rather than considering the claim as a whole, and why such elements could reasonably be combined. Moreover, by making such a combination of references without proper evidentiary support, the Examiner is neglecting the technical barriers required to develop and enable the claimed invention. Accordingly, a *prima facie* case of obviousness has not been established.

The Examiner further asserts *Knoot* is directed to semiconductor processing and more specifically to monitoring of optical signals. Therefore, *Knott* is not in a different field of endeavor. In response, the Appellants respectfully submit that the teaching of *Knott*, a modulation frequency less than 20 Hertz, is utilized to use in a temperature measurement system in a RTP chamber. There is no teaching, suggestions or evidence in *Knott* to suggest that a certain modulation for temperature sensing would provide any benefit for other types of measurements, particularly for distance measurements. Again, the Appellants respectfully submit that each technology has its own technical barriers required to develop and enable a desired technique. Merely reconstruction the elements taught in disparate technologies would not necessarily yield an operable and desired apparatus. In other words, there is not evidence to support that one would seek to utilize a modulation frequency utilized for temperature measurement such as *Knoot* to obtain CD measurement information as claimed.

Additionally, with regard to the Examiner's response to Appellants' argument about *Yonezawa*, *Shoham*, *Egermeier* and *Wilby*, in response, the Appellants respectfully submit that there are no evidence, suggestion or teaching in these cited references suggesting that reconstruction of the several tools described therein would

provide reasonable expectation of success that would yield a resultant apparatus that would obviate the claimed invention. Accordingly, a *prima facie* case of obviousness has not been established.

Accordingly, reversal of the Examiner's rejection is respectfully requested.


CONCLUSION

For the reasons stated above, Applicants respectfully submit that the rejection of claims 1, 3-4, 6-13, 15-18, 20-21, 23-30, 32-33 and 50-59 is improper. Reversal of the rejections is respectfully requested.

Respectfully submitted,

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June 3, 2009
Date


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